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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/594,868

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EXAMINER

HORNING, JOEL G

ART UNIT

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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/594,868	Applicant(s) ROSE ET AL.	
	Examiner JOEL G. HORNING	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 14-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02-16-07;12-14-06;09-28-06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. **Claims 14-20** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on June 22nd, 2009.

Claim Objections

2. **Claim 8** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 8 does not require any limitation that is not found in its parent claim. Furthermore, if claim 8 is consistent, it would appear to actually broaden claim 1, since the precursor is no longer required to actually include a cross-linked inorganic-organic hybrid pre-polymer.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claim 8** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claim 1 requires that the coating precursor contain a cross-linked inorganic-organic hybrid pre-polymer formed by sol-gel processing, so when dependent claim 8 teaches that the precursor could alternatively be just “obtainable” from such a precursor (but not necessarily be such a precursor), it appears to broaden the independent claim rather than narrowing it. This leaves a practitioner with uncertainty as to the scope of the claim. For the purpose of examination, it will be assumed that the precursor must include a cross-linked inorganic-organic hybrid pre-polymer.

4. **Claim 9** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 lists several chemicals by their acronyms, which are not defined.

It additionally contains several trademark/trade name (i.e. Dynasil®, Bayresit®, etc). Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. Accordingly, the identification/description is indefinite.

Furthermore, it should be capitalized wherever it appears and be accompanied by the generic terminology. Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. **Claims 1-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin et al (WO 03/086031, as supplied by applicant) in view of Swihart et al (US 4447499).

The instant claims are directed towards a method for coating a substrate with an inorganic-organic hybrid polymer material using the dielectric barrier discharge technique comprising the steps of:

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- a. Introducing a sample between two electrodes
- b. Controlling the atmosphere between the electrodes,
- c. Generating a plasma discharge between the electrodes,
- d. Mixing aerosols containing hybrid organic/inorganic cross-linked pre-polymers formed via sol-gel processing into the plasma discharge.

Goodwin et al is directed towards a process for depositing coatings on substrates. The process is performed in a system where there are two electrodes with a dielectric plate between them which is used to create a plasma discharge (which is what a dielectric barrier discharge is). The atmosphere between the two electrodes is controlled to form a plasma discharge between them. An atomizer is used to introduce an aerosol of a precursor for a coating forming material into the plasma [0019]. A substrate to be treated is introduced between these electrodes while the atmosphere is being controlled to generate a plasma discharge [0051], the aerosol precursor material is introduced into the plasma discharge [0052], so that a coating is deposited on the substrate [0053]. Goodwin et al further teaches using different precursors depending upon the desired film, such as polydimethylsiloxane precursor (which is a hybrid inorganic/organic pre-polymer which is formed of smaller cross-linked units) [0040], in order to form an inorganic-organic hybrid polymer material (polydimethylsiloxane) [0046], but does not teach how such precursors are formed.

However, Swihart et al is directed towards coating substrates using polydiorganosiloxanes (including methyl) (abstract), and it teaches that these

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siloxanes can be formed by conventional methods, including hydrolysis/condensation of dimethylsilanes (col 3, lines 45-56), which is a sol-gel processing.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to form the polydimethylsiloxanes of Goodwin et al by a sol-gel process, since it was a conventionally known process for creating such molecules and would produce predictable results (**claims 1 and 8**).

6. Regarding **claim 2**, Goodwin et al teaches supplying mixtures of its different precursors, including the non cross-linked silane gas with the polydimethylsiloxane precursor [0040].
7. Regarding **claim 3**, aerosols are mixtures of solids or liquids with gases. As shown in figure 3, the aerosol creating spray nozzle **74** produces an expanding fan-like spray [0052], thus the volume fraction of liquid or solid in the aerosol will decrease as the distance from the nozzle increases (the fluid volume is being diluted by an increasing volume of the gas in the aerosol). This is a compositional gradient in the pre-polymer material in the aerosol.
8. Regarding **claim 4**, the Goodwin et al process takes place at atmospheric pressure (abstract), which is within applicant's claimed range.
9. Regarding **claim 5**, Goodwin et al teaches using a frequency of 29kHz [0061], which is within applicant's claimed range.
10. Regarding **claims 6 and 13**, the substrate can be a moving web (**claim 13**) [0017], which can comprise a plastic (**claim 6**) [0042].

11. Regarding **claim 7**, the coating is taught to modify the properties of the surface, compared to the uncoated substrate. For instance, by increasing the hydrophobicity [0046].
12. Regarding **claim 9**, the polydimethylsiloxane could be obtained from tetramethoxysilane. The process would require replacing two opposing methoxy groups with methyl groups, which would produce a dimethylsilane with two silicon-bonded hydrolyzable radicals (the methoxys) which could then be hydrolyzed and condensed via a sol-gel process to form the polydimethylsiloxane precursor material.
13. Regarding **claim 10**, Goodwin et al further teaches that the pre-polymer mixture can also comprise colloidal metals [0046].
14. Regarding **claim 11**, Goodwin et al further teaches supplying helium to the plasma [0032], which can be supplied from a separate source **75** from the aerosol nozzle **74** before it is mixed together in the chamber [0052] (figure 3).
15. Regarding **claim 12**, Goodwin et al further teaches that the precursor may be applied as a liquid [0039].
16. **Claims 3** is additionally rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin et al (WO 03/086031) in view of Swihart et al (US 4447499) as applied to claim 1, further in view of Chow et al (US 20020031658).

Goodwin et al teaches forming multilayer coatings on its substrates [0044], but does not teach how the interfaces between those layers should be formed.

However, Chow et al is also directed towards the spray deposition of organic-inorganic hybrid materials [0013] through aerosols [0032]. It teaches that by varying

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the composition of the precursor feedstock supplied during spraying , a fine composition gradient can be formed in the coating (abstract), which increases the compatibility of hybrid multilayered materials [0027] and can enhance the thermal, chemical and mechanical stability of the multilayer coatings and enhance control of their properties [0033].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to supply a compositional gradient in the supplied aerosol precursor during deposition in order to form graded interfaces between the different layers in a multilayered coating in order to increase the layer compatibility, improve the stability of the resulting film and in order to better control the properties of said film (**claim 3**).

Conclusion

17. No current claims are allowed.

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. WO 03/066933.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792